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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/275,534 03/24/99 JAHN

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EXAMINER

IM71/0730

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ART UNIT	PAPER NUMBER

1723

DATE MAILED:

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#18

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/275,534

Applicant(s)

JAHN ET AL.

Examiner

David L. Sorkin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 May 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 and 17-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 17-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 April 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 10 April 2001 is: a) ☐ approved b) ☒ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Prosecution Application

1. The request filed on 31 May 2001 for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 09/275,534 is acceptable and a CPA has been established. An action on the CPA follows.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the concentric channels must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

3. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 10 April 2001 have been disapproved, as stated in paper No. 16.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-16 and 17-22 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. No support is found in the original specification for the disc being one-piece.

6. Claims 22 and 17 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. It is quite unclear what is being claimed in 22 and 17 (see rejections under the second paragraph of 35 U.S.C. 112), but to the extent which they are understood, they are not enabled. In claim 22, a module which engages into another module is claimed. While, a module engaging into a void defined by the boundaries of another module is enabled, two modules which occupy the same region are not. More specifically, no second module is enabled which engages into the space between the front and rear planes of a region of another module; however, this is claimed in 22 (and 17).

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-15, and 17-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. Claim 1 recites the limitations "the flanks (8)", and "the flanks (9)". There is insufficient antecedent basis for these limitations in the claim.

10. Claim 2 recites the limitations "the disc plane of the front side ", and "[the disc plane] of the rear side". There is insufficient antecedent basis for these limitations in the claim.

11. In claim 3, the phrase "wherein the flanks (8) of the inlet channels (4), of the flanks (9), or both, of the mixing channels (5)" is unclear.

12. Claim 4 recites the limitation "the mid-axis". There is insufficient antecedent basis for this limitation in the claim. Also, are the orifices required to be of a symmetry such that a mid-axis is defined?

13. Claim 4 recites the limitation "the wall". There is insufficient antecedent basis for this limitation in the claim.

14. Claim 4 recites the limitation "the flank plane". There is insufficient antecedent basis for this limitation in the claim.

15. Claim 4 recites the limitation "the flanks". It is unclear whether this includes flanks (8), flanks (9), or both.

16. Claim 4 recites the limitation "the channels". It is unclear whether this includes the inlet channels (4), mixing channels (5), or both.

17. Claim 8 recites the limitation "the boundaries of the regions or segments". There is insufficient antecedent basis for this limitation in the claim.

18. Claim 9 recites the limitations "the planes of the front side" and "the planes of the rear side". There is insufficient antecedent basis for this limitation in the claim.

19. Claim 10 recites the limitation "the disc plane". There is insufficient antecedent basis for this limitation in the claim.

20. Regarding claim 14, there is lack of antecedent basis for "the mixing channels of one of said mixer modules" and "the inlet channels of the other of said mixer modules".

The two mixer module of claim 13, from which claim 14 depends, are not recited as having mixing channels or inlet channels.

21. Claim 17 recites the limitation "the engaging static mixer". There is insufficient antecedent basis for this limitation in the claim.

22. Claim 17 recites the limitation "the said plane". It is unclear which plane is being referred to.

23. Regarding claim 17, the meaning of the phrase "having a maximum spacing from the planes of the front side or the rear side respectively" is unclear.

24. Regarding claim 17, it is unclear if the limitation "the disc-shaped static mixer module" refers to that first recited in claim 12 or claim 22.

25. Regarding claim 18, it is unclear if "an individual mixer module" is required to be one of said "at least two mixer modules".

26. Claim 18 recites the limitation "the front side". There is insufficient antecedent basis for this limitation in the claim.

27. Regarding claim 21, it is unclear if "an individual mixer module" is required to be one of said "at least two mixer modules".

28. Claim 21 recites the limitation "the front side". There is insufficient antecedent basis for this limitation in the claim.

29. Claim 22 recites the limitation "a conventional static mixer". It is unclear what structures are included by this limitation.

30. Claim 22 recites the limitations "the planes of the front side" and "the planes of the rear side". There is insufficient antecedent basis for these limitations in the claim.

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31. Claim 22 recites the limitations "the outer [contour]" and "[the inner] contour".

There is insufficient antecedent basis for this limitation in the claim.

32. Claim 22 recites the limitations "the boundaries of the regions or segments".

There is insufficient antecedent basis for this limitation in the claim.

33. Claim 22 recites the limitation "the regions or segments of the disc-shaped static mixer module which have a smaller spacing between the disc plane of the front side and the disc plane of the rear side than the remaining regions or segments". There is insufficient antecedent basis for this limitation in the claim.

34. Regarding claim 22, it is unclear if the limitation "the disc-shaped static mixer module" refers to that first recited in claim 12 or claim 22.

Claim Rejections - 35 USC § 102

35. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

36. Claims 1, 2, 5-10 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Pellerin (US 4,295,458). Pellerin ('458) discloses a static mixer module, comprising a one piece disc which is provided with a multiplicity of orifices and which is structured on its front side and on its rear side by means of inlet channels and mixing channels running concentrically, and in which the orifices are made in flanks of the inlet channels and open into flanks of the mixing channels (see figs. 5 and 6). Regarding claim 2, the inlet channels and mixing channels have straight flanks which are at an

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angle of 5-85 degrees to the disc plane (see fig. 5). Regarding claim 5, the channels have a V-shaped profile (see fig. 5). Regarding claim 6, the mixer module is divided into two or more regions which have differently arranged or differently structured inlet channels and mixing channels (see fig. 5 and col. 2 lines 14-15). Regarding claim 7, the mixer module is divided into two or more regions which have different spacings between the orifices or different cross-sectional openings of the orifices (see col. 2 lines 14-15). Regarding claim 8 the boundaries of the regions are arranged concentrically about a center point of the mixer module (see fig. 6). Regarding claim 9, the spacing between the planes of the front side and the planes of the rear side of the mixer is different in the various regions (see fig. 5). Regarding claim 10, the baffle has on the front side baffle surfaces (see fig. 5). Regarding claim 20, the baffle surfaces are flattenings or sheet-like elevations (see fig. 5).

37. Claims 1, 2, 5, 11-15, 18, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by King (US 5,605,399).

38. Claim 1: King ('399) discloses a static mixer module comprising a one-piece (see col. 4, lines 3-16) disc (12) which is provided with a multiplicity of orifices (relatively large rectangular orifices, fig. 3) and which is structured on its front side facing the mix and on its rear side by means of inlet channels and mixing channels running in parallel, and in which the orifices are made in the flanks of the inlet channels and open into the flanks of the mixing channels (fig. 3).

39. Claim 2: The inlet channels of King ('399) have straight flanks which are at an angle of 5-85 degrees to the disc plane (fig. 3).

40. Claim 5: The inlet channels of King ('399) have a V-shaped cross-sectional profile (fig. 3).

41. Claim 11: The module of King ('399) consists of non-ferrous metal (column 4, line 6).

42. Claims 12-15: Regarding claim 12, King ('399) discloses a mixer arrangement comprising at least two static mixer elements arranged one behind the other (fig. 3), wherein at least one mixer element is the disc-shaped static module described above with regard to instant claim 1. Regarding claim 13, at least two modules are directly behind one another (see fig. 3). Regarding claim 14, mixing channels of a first mixer are rotated relative to the inlet channels of a second mixer (see col. 4, lines 44-49). Regarding claim 15, the mixers are between 5 and 175 degrees relative to one another (see col. 4, lines 44-49).

43. Claim 18: King ('399) discloses a mixer with at least two of the static mixer modules discussed above regarding instant claim 1, in which the mixer modules are installed in a pipe, through which mix flows, in such a way that the front side of a mixer module points in the opposite direction to the direction of the flow of the mix (fig. 3).

44. Claim 21: The mixer arrangement of King ('399) described above with regard to instant claim 12 is installed in a pipe, through which mix flows, in such a way that the front side of an individual mixer module from the mixer arrangement points in the opposite direction to the direction of the mix (fig. 3).

Claim Rejections - 35 USC § 103

45. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

46. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pellerin ('458) in view of King ('399). Pellerin ('458) is silent as to what material the mixer comprises. King ('399) teaches a static mixer made of a non-ferrous metal (see col. 4, lines 3-9). It is considered that it would have been obvious to one of ordinary skill in the art to have made the mixer of King ('399) of non-ferrous metal, for example to resist heat and corrosion.

47. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over King ('399). The static mixer module of King ('399) is described above regarding instant claim 1. King (399) fails to explicitly disclose an angle between a mid-axis or orifice wall and a flank of +30 or -30 degrees. Based upon figure 7, the orifices appear to have an angle beta of about 90 on two sides (those of length $2^{1/2}L$) and about 30 degrees the side of length L which is defined by portion 31 (because the angle of 31 relative to 33 is about 30 degrees). However, it is considered that it would have been obvious to one of ordinary skill in the art to have optimized the exact value of the angle to suit a particular application.

48. Claims 3, 10, 17, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over King ('399) in view of Jeffers (US 616,191).

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49. Claim 3: King ('399) discloses the static mixer module discussed above with regard to claim 1. The flanks of the inlet channels are straight, however an angle of less than 15 degrees is not explicitly disclosed. However, it is considered that it would have been obvious to have optimized the angle for a particular application, for example in applications where a short length module is desire (see col. 5, lines 54-58).

Additionally, King (399) fails to disclose spacer contours. Jeffers ('191) teaches spacer contours (H). It is considered that it would have been obvious to one of ordinary skill in the art to have utilized spacer contours in the module of Kings (399) to aid in the attachment of multiple modules, as taught by Jeffers ('191) (page 1, lines 87-99).

50. Claim 19: In the mixer module of King (399) in view of Jeffers ('191) discussed above with regard to instant claim 3, the spacer contours are bosses (fig. 3). (Note: for a static mixer with an alternate spacer contour shape see Hodan, US 5,137,369.)

51. Claim 10: King ('399) discloses the static mixer module discussed above with regard to claim 1. King ('399) fails to disclose the module having on its front side baffle surfaces in the disc plane. Jeffers ('191) teaches a module having on its front side baffle surfaces (G). It is considered that it would have been obvious to one of ordinary skill in the art to have utilized baffle surfaces in the disc plane of the module of Kings ('399) to aid in the attachment of multiple modules, as taught by Jeffers ('191) (page 1, lines 87-99).

52. Claim 20: The baffle surfaces of King ('399) in view of Jeffers ('191), discussed above with regard to instant claim 10, are flattenings (fig. 3).

53. Claims 6-9, 22 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over King ('399) in view of Hirsch (US 3,572,391).

54. Claim 6: King ('399) discloses the static mixer module discussed above with regard to claim 1. King ('399) also discloses different arranged inlet channels (12 versus 13 versus 14). King ('399) fails to disclose a disc divided into regions or segments. Hirsch ('391) discloses a disc divided into regions or segments (fig. 1). It is considered that it would have been obvious to one of ordinary skill in the art to have incorporated the different arrangements, into different regions of a single disc, to prevent the velocity of flow from being different near the walls versus near the center of a pipe, as taught by Hirsch (391) (see abstract).

55. Claim 7: King ('399) discloses the static mixer module discussed above with regard to claim 1. King ('399) also discloses different spacing between orifices (12 versus 13 versus 14). King ('399) fails to disclose a disc divided into regions or segments. Hirsch ('391) discloses a disc divided into regions or segments (fig. 1). It is considered that it would have been obvious to one of ordinary skill in the art to have incorporated the different arrangements, into different regions of a single disc, to prevent the velocity of flow from being different near the walls versus near the center of a pipe, as taught by Hirsch (391) (see abstract).

56. Claim 8: The static mixer module of King ('399) in view of Hircsh ('391) is discussed above with regard to instant claim 6. The regions or segments taught by Hircsh ('391) are arranged concentrically about the center point of the disc. It is considered that it would have been obvious to one of ordinary skill in the art for the

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regions of King ('399) in view of Hirsch ('391) to be concentric, to prevent the velocity of flow from being different near the walls versus near the center of a pipe, as taught by Hirsch (391) (see abstract).

57. Claim 9: The static mixer module of King ('399) in view of Hirsch ('391) is discussed above with regard to instant claim 6. In the different arrangements disclosed by King (399), the spacing between the planes of the front and rear side are also different (spacing of $14 < 13 < 12$).

58. Note: It is especially unclear what is being claimed in claims 22 and 17 (see rejections under 35 U.S.C. 112 above), but these claims have been considered with regard to the prior art to the extent possible.

59. Claim 22: The arrangement of King ('399) is discussed above with regard to instant claim 12. King ('399) also discloses different spacing between orifices (12 versus 13 versus 14). The spacing between the planes of the front and rear side are also different (spacing of $14 < 13 < 12$). These discs (12,13,14) of King ('399) fail to be divided into regions or segments. Hirsch ('391) discloses a disc divided into regions or segments (fig. 1). It is considered that it would have been obvious to one of ordinary skill in the art to have incorporated the different arrangements, into different regions of a single disc, to prevent the velocity of flow from being different near the walls versus near the center of a pipe, as taught by Hirsch (391) (see abstract). The discs (12,13 and 14) King ('399) fail to be adapted to boundaries of another module, such that a portion of one is enclosed by a portion of the other. However King ('399) discloses another module (37) the outer contour of which is adapted to the boundaries of yet another

module (38), producing a combined beneficial effect (see col. 5 line 59 to 11; fig. 3). It is considered that it would have been obvious to one of ordinary skill in the art to engage the modules (12, 13, 14) as described. One would be motivated to do so to accomplish mixing in as short a length of pipe as possible, which is an advantage recognized by King ('399) (column 5, lines 54-58).

60. Claim 17: The mixer arrangement described above with regard to claim 22 is also considered to meet the limitations of claim 17. King ('399) teaches flush abutment (see col. 5 line 59 to 11; fig. 3). It is considered that it would have been obvious to one of ordinary skill in the art to abut the modules flushly as described in instant claim 17. One would be motivated to do so to accomplish mixing in as short a length of pipe as possible, which is an advantage recognized by King ('399) (column 5, lines 54-58).

Response to Arguments

61. Applicant argues that the new limitation "one-piece..." distinguishes over King. However, it is clear from col. 4, lines 3-16 that the mixer of King is one-piece. Although it is *made from* multiple pieces it *is* one piece. An apparatus claim covers what the device *is*, not the process by which it is made (see MPEP 2113 and 2114).

62. The applicant expresses disagreement with many of the 112nd paragraph rejections. The examiner believes that if applicant carefully rereads claim 3, he will agree that it is unclear. What could "the flanks of the inlet channels of the flanks or both of the mixing channels" possibly mean? Regarding claim 4, applicant inquires "how could an orifice not have a mid axis?". A geometry object has a "mid axis" only if a rotational transformation about an axis would result in an identical geometric object.

Geometric objects with mid axes include cylinders, cones, cubes, tetrahedrons and other symmetric objects. Asymmetric objects such as bananas, shoes, and the letter "L" do not have mid axes. An example of a cross-sectional view of a disc having an orifice with no mid axis is presented below:



The issue is whether or not the instant claims are limited to symmetric orifices. Applicant argues regarding claims 1 and 4 that flanks are inherent in all channels and that a "flank plane" is inherent in a flank. Does applicant believe that non-planar channels do not exist? Can a channel not be curved? Hasn't applicant submitted a proposed figure 7 illustrating flanks which are non-planar?

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Sorkin whose telephone number is 703-308-1121. The examiner can normally be reached on 7:30 - 5:00 Mon.-Thur., Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L. Walker can be reached on 703-308-0457. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-7718 for regular communications and 703-305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

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David Sorkin

David Sorkin

July 25, 2001

Charles E. Cooley

CHARLES E. COOLEY
PRIMARY EXAMINER